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Fig. 1

Prior Art FX Settlement Process

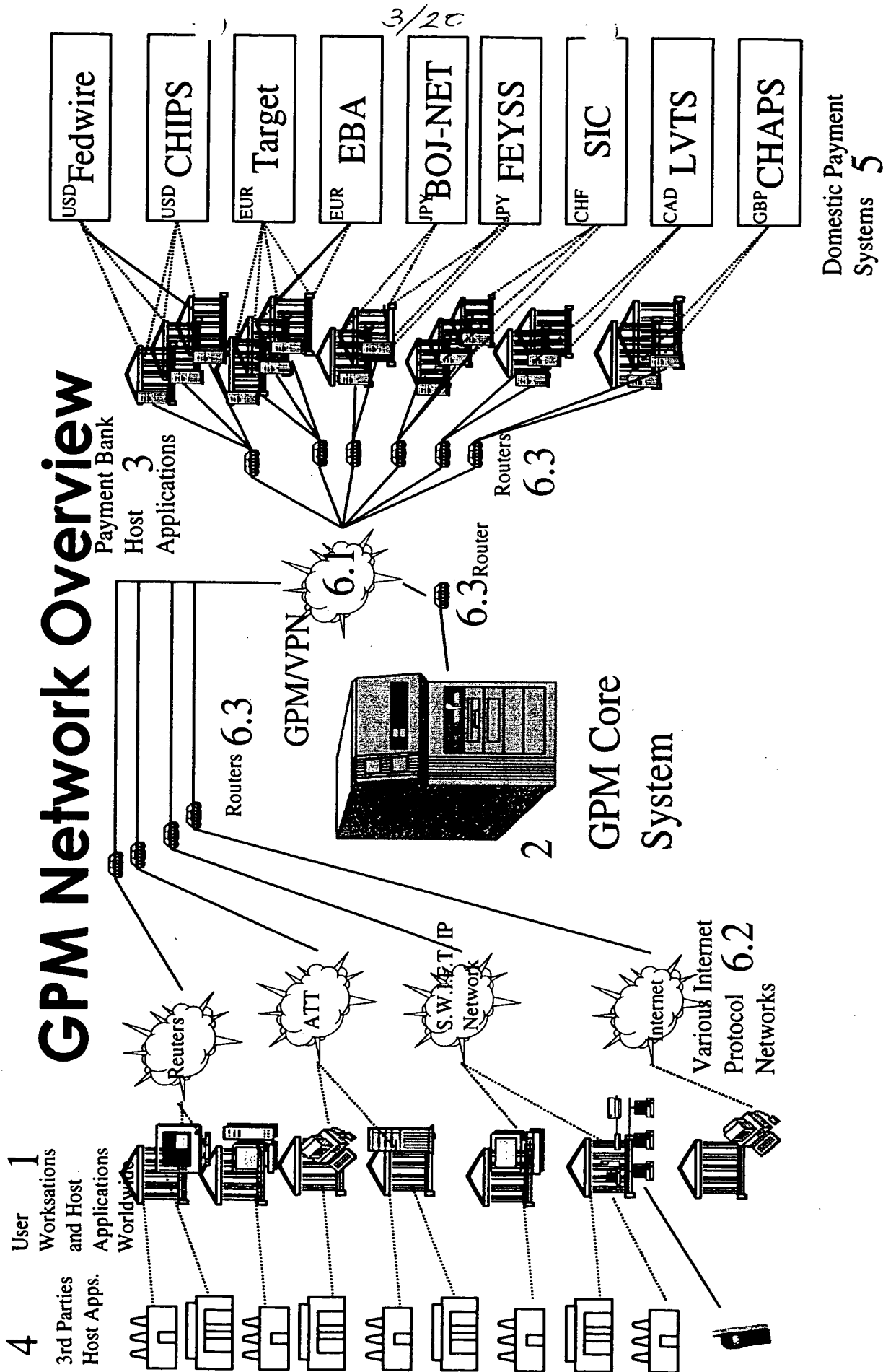| Trade Date	Settlement Date	Reconciliation Date
• Parties transact a series of transactions in various currency pairs	• Branch or nostro constructs payment queue	• MT950s from all branches and nostros reconciled to match payment and counterpayment (receipt) settlement of transactions
• Parties send confirmations of each trade MT300	• Branch or nostro releases payments as liquidity in local payment system allows	• Exception report of failed settlements generated
• Parties match MT300s to create a confirmed trade	• Branch or nostro sends MT900 to confirm payments	• Failed settlements queried with counterparties
• Parties instruct payment of sold currency leg for each trade	• Branch or nostro sends MT910 to confirm receipts	• Decisions on default/payment suspension taken after investigation
• Parties pre-advice receipt of bought currency leg for each trade	• Branch or nostro sends MT950 daily statement of account activity	• Payments at branches and nostros cancelled on a "best efforts" basis

Fig. 2

Risk

PAYMENT RISK = The risk of losing the amount of payment in the event of failed counterpayment (non-receipt)

LIQUIDITY RISK = The cost or penalty associated with unanticipated receipt shortfalls

SYSTEMIC RISK = Risk associated with the general health or structure of the financial system as a result of inability to cope with a financial default or liquidity shock

Fig. 3

GPM Network Overview

Domestic Payment Systems 5

USD Fedwire
USD CHIPS
EUR Target
EUR EBA
JPY BOJ-NET
JPY FEYSS
CHF SIC
CAD LVTS
GBP CHAPS

Payment Bank Host **3** Applications

Routers **6.3**

Routers 6.3

GPM/VPN **6.1**

6.3 Router

GPM Core System

2

Routers 6.3

S.W.I.F.T/IP Network

Reuters

ATT

Internet

Various Internet Protocol Networks **6.2**

1 User Worksations and Host Applications Worldwide

4 3rd Parties Host Apps.

Fig. 4

Payment Banks Worldwide

6.3

GPM/VPN 6.1

Router 6.3

Payment Bank Host Applications 3

GPM System

IP Networks 6.2

Router 6.3

1

User Worksations and Host Applications Worldwide

Operations Workstation 2.1

Database Server 2.2

Security & Authentication Server 2.3

Process Server 2.4

Web Server 2.5

2.6

Ethernet

Bridge

Ethernet

2.12

2.11

Backup Ops Workstation 2.7

Backup/Mirrored Database Server 2.8

Backup Process & Auth. Server 2.9

Backup Web Server 2.10

Fig. 5

GPM Access Security

Certificate Issuance

User/Payment Bank

→ **GPM Core**

→ **GPM Certificate Authority** → **GPM Registration Authority** → **Certificate Management System**

→ **Directory**

Host Application requestsGPM account
Passes to GPM Certificate Authority
Requests Certificate
Fills out form
Creates Key Pair
Submits Form and Public Key to Registration Authority
Registration Authority Approves/Rejects Application
Digital Certificate Generated
User Entered in Directory
Digital Certificate Delivered to Host Application

Certificate Usage

User/Payment Bank

→ **GPM Security Application**

→ **Certificate Validation Program**

→ **Application**

→ **Directory**

→ **Certification Interface** → **UserID/PW Validation**

Host Application requests GPM session
Passes to GPM security application
Presents Signed Certificate
Validation Program Validates Certificate
Validation Program Validates Privileges

Fig. 6

GPM FX Settlement Process

Trade Date

- Parties transact a series of transactions in various currency pairs

- Parties send confirmations of each trade MT300

- Parties match MT300s to create a confirmed trade

- Parties instruct payment of sold currency leg for each trade to Payment Bank

- Parties pre-advice receipt of bought currency leg for each trade

- **Parties advise GPM Payment Banks of Risk Parameters**

Settlement Date

- Payment Bank constructs payment queue

- **Payment Bank Host Application releases payments through GPM Filter Process**

- Payment Bank sends MT900 to confirm payments and MT910 to confirm receipts

- **Payment Bank Host App. notifies sustained imbalance as observed**

- **Exception queries, Suspend Process and liquidity management decisions taken intraday**

- Payment Bank sends MT950 daily statement of account activity

Reconciliation Date

- MT950s from all branches and nostros reconciled to determine settlement of transactions

- Follow-up on individual failed settlements / defaults

GPM Flow Diagram
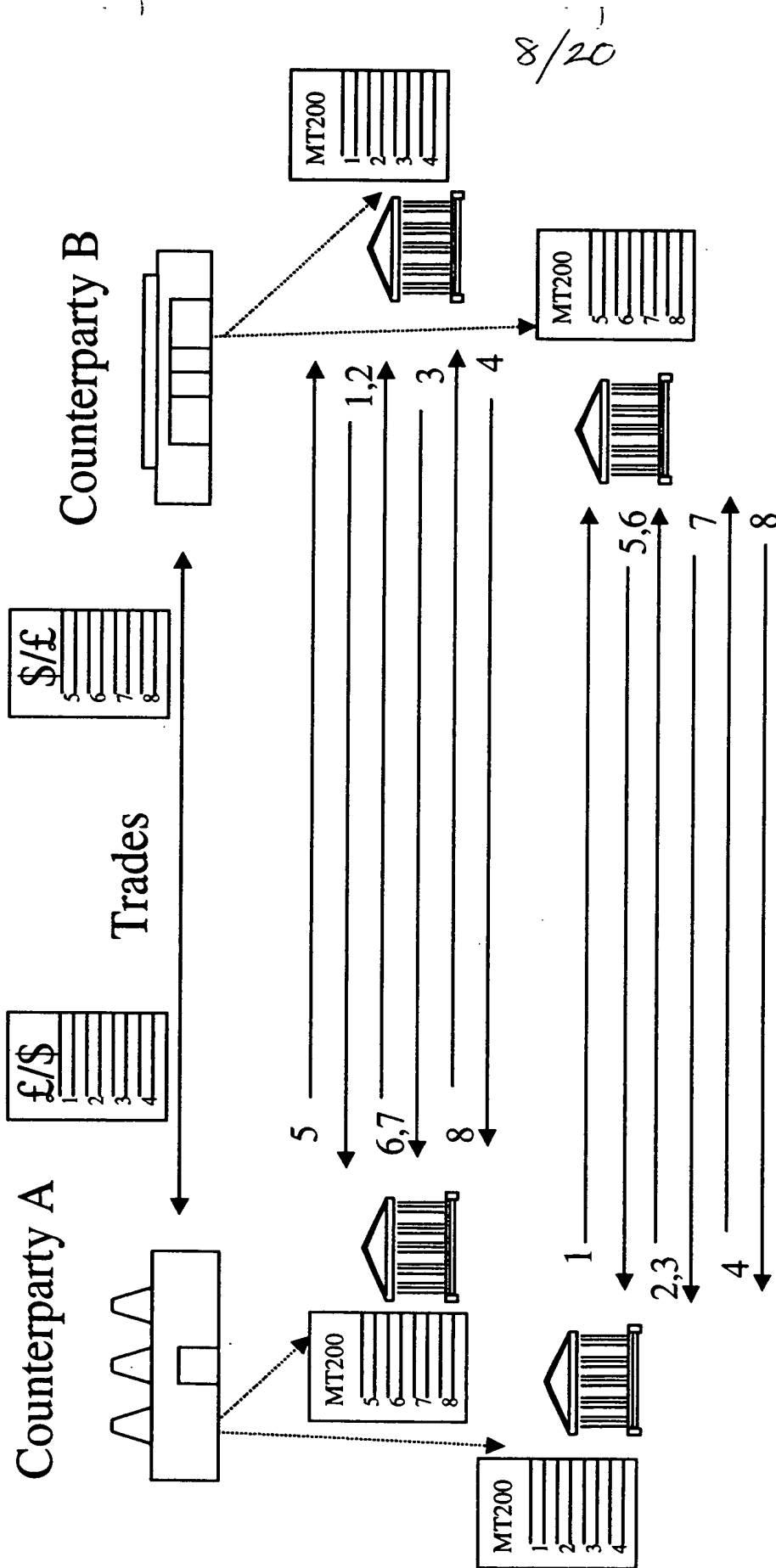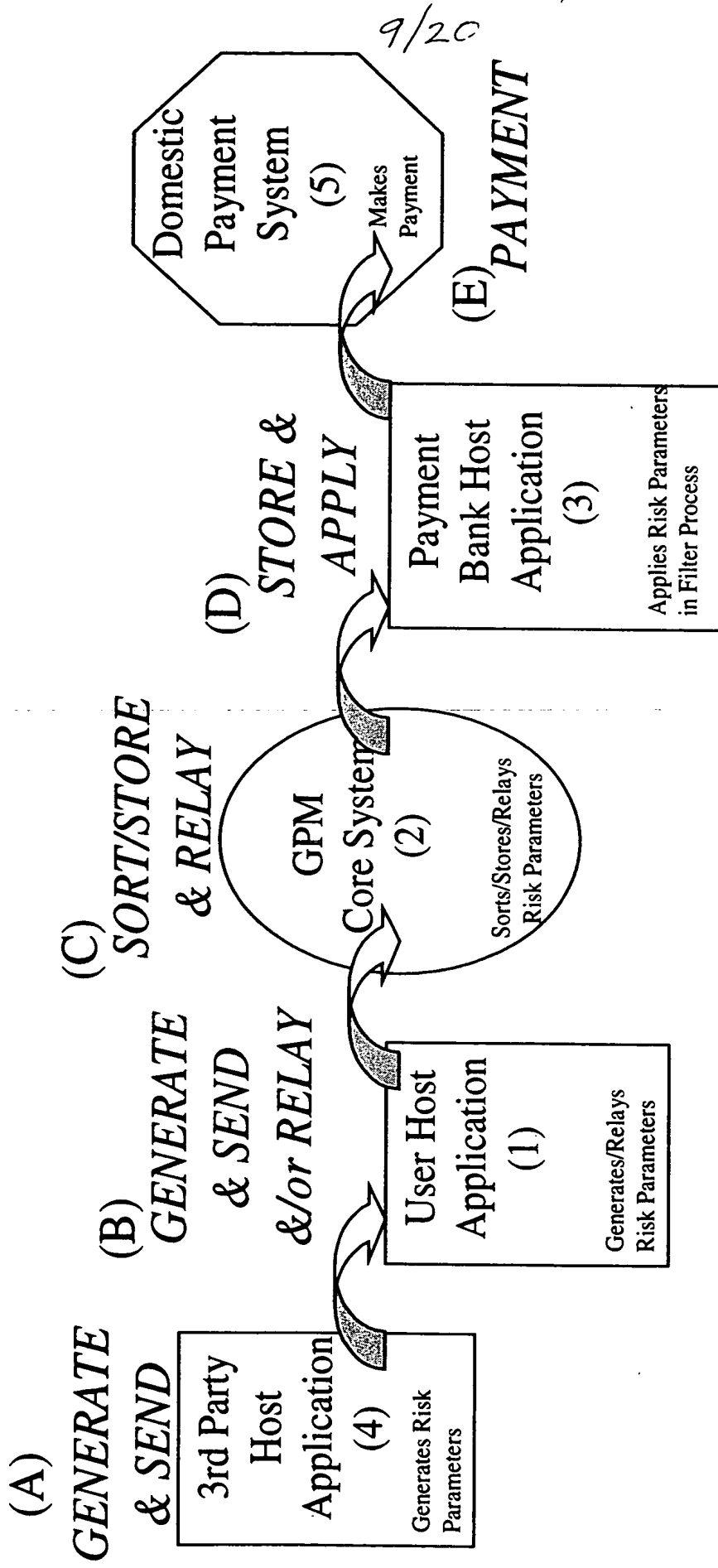
Fig. 7

USER (1)

Transaction Confirmation and Matching System (MT300 et al.) B

Payment Instructions (MT200, MT202 and MT210) C

Risk Management Systems G

User Host Application

Risk Parameters & Suspend Instructions 1.1 H

Messaging, Notifications, Inquiries, Reports Y 1.2

S.W.I.F.T. A D E

GPM Core (2)

GPM Host Appl.: Rules Based Processing and Routing 2.1 J K I

Messaging, Notifications, Inquiries, Reports W 2.2 V X

DATASTORE 2.3 Z

PAYMENT BANK (3)

Forward Payment Instructions Cache F

Payments Queue L

Payments/ Liquidity Manager M N FAIL O PASS

Filter Process P 3.1 Q FAIL R PASS Notify

Payment Bank Host Application U 3.2 Messaging, Notifications, Reports

Gateway to Payment System S

Incoming Receipts T

Payment

Receipt

Fig. 8

GPM in Action

Counterparty A

Counterparty B

Trades

£/$
1
2
3
4

$/£
5
6
7
8

MT200
1
2
3
4

MT200
5
6
7
8

MT200
5
6
7
8

MT200
1
2
3
4

5

6,7

8

1,2

3

4

1

2,3

4

5,6

7

8

Fig. 9A1

Risk Parameter Instruction Process

(A)
GENERATE & SEND

3rd Party
Host
Application
(4)

Generates Risk Parameters

(B)
GENERATE & SEND &/or RELAY

User Host Application
(1)

Generates/Relays Risk Parameters

(C)
SORT/STORE & RELAY

GPM Core System (2)

Sorts/Stores/Relays Risk Parameters

(D)
STORE & APPLY

Payment Bank Host Application
(3)

Applies Risk Parameters in Filter Process

Domestic Payment System
(5)

Makes Payment

(E) *PAYMENT*

Fig. 9A2

Risk Parameter Instruction Fields

Status	Tag	Field Name	Content/Options	No
M	52a	USER	4a2a2b[3b]	1
O	50	THIRD PARTY (Ordering Customer)	4a2a2b[3b]	2
M	53a	PAYMENT BANK (Sender's Correspondent)	4a2a2b[3b]	3
---->				
M	59	COUNTERPARTY (Beneficiary Customer)	4a2a2b[3b]	4

M	32A	CLEAN PAYMENT LIMIT [Value Date] Currency Code Amount	[6n] 3a 15d	5
---->				
O	<XX>	PAYMENT TYPE	<2a3n[4a]>	6

FIELD 52A - USER
Definition: The Unique Identifier (UID) of the User institution initiating the instruction on behalf of itself or a Third Party.
Format: 4a2a2b[3b]

FIELD 50 - THIRD PARTY
Definition: The UID of the Third Party initiating the instruction to the User.
Format: 4a2a2b[3b]

FIELD 53a - PAYMENT BANK
Definition: The BIC code of the Payment Bank
Format: 4a2a2b[3b]

FIELD 59 - COUNTERPARTY
Definition: The UID of the Counterparty/Payee on outgoing payments instructions.
Format: 4a2a2b[3b]
Multiple instances of this field are permitted.

FIELD 32a - CLEAN PAYMENT LIMIT
Definition: [Value date] (optional), currency code and amount of Clean Payment Limit.
Format:
    [6n] date (YYMMDD)
    3a currency code
    15d amount

FIELD XX - PAYMENT TYPE
Definition: Descriptor(s) of Payment Types for Filter Process
Format: 2a3n[4a] (e.g., MT200, MT202, etc., plus optional channel identification)
Where this optional field is left blank, the GPM Filter Process will apply to all payments made on behalf of a referenced User/3rd Party to a referenced Counterparty. Multiple instances of this field are permitted.

Fig. 9B

Risk Parameters

COUNTERPARTY: A defined entity (or aggregation of entities) recognisable as Payee(s) or Payor(s) on a payment message through reference to industry standard identifiers used in payments messaging.
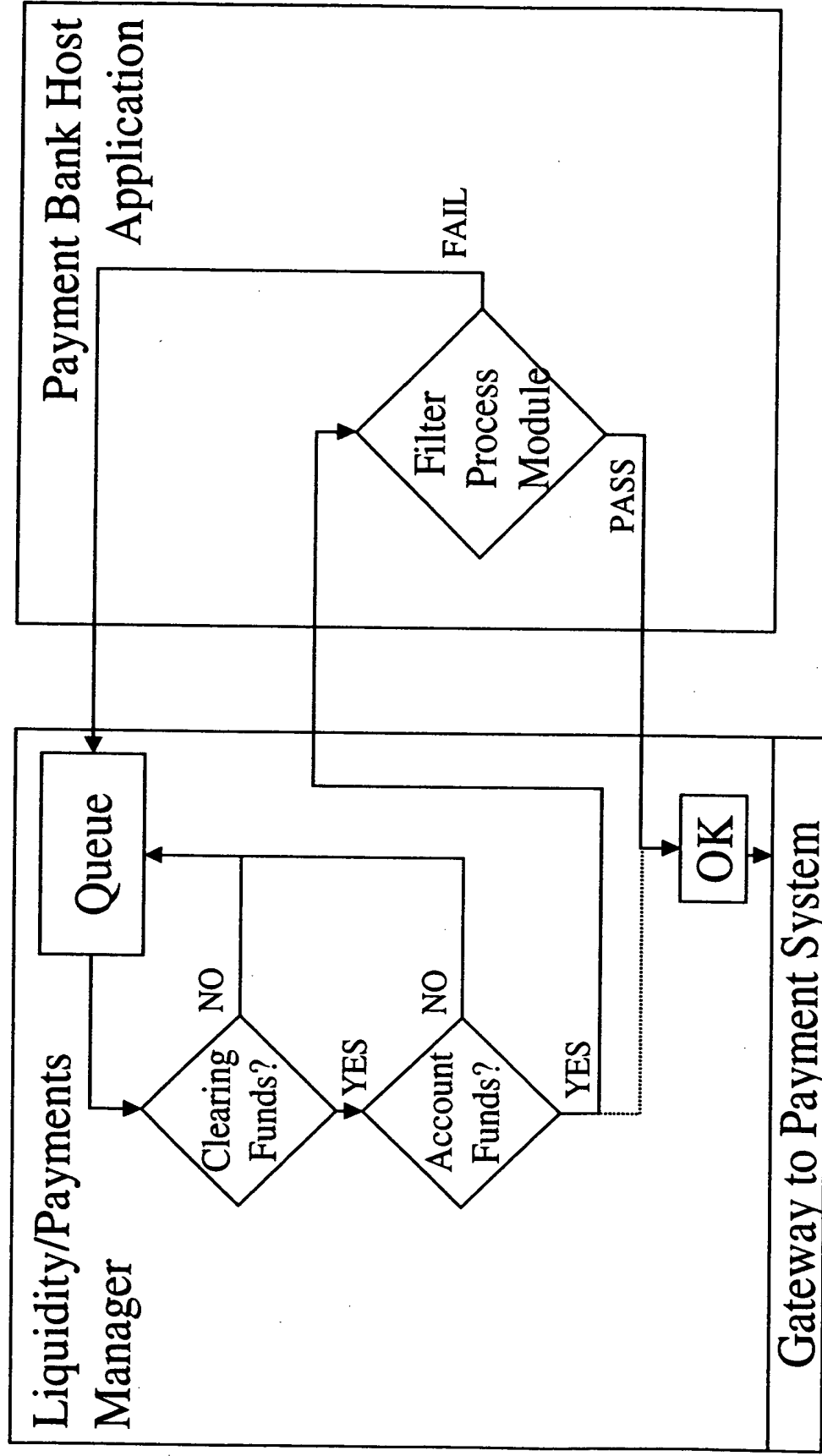
CLEAN PAYMENT LIMIT: Value threshold on payments from a User/3rd Party as "Payor" in respect of a designated Counterparty as "Payee". Acts as a debit cap on payments vis-à-vis a Counterparty.

PAYMENT TYPE: Given payment type descriptors (specified in payments message standards), allows selection of payment types for subjecting to the Filter Process.

Fig. 9C

PAYMENT BANK APPLICATION INTEGRATION

Fig. 9D1

GPM Filter Process

Step A: Identify Payor

Step B: Assess whether Payor is GPM User/3rd Party

    If NO then PASS payment instruction; If YES then

Step C: Identify Payee

Step D: Identify whether Payee is a GPM Counterparty

    If NO then PASS payment instruction; If YES then

Step E: Check whether Payee/Counterparty has been Suspended

    If YES then FAIL payment instruction + NOTIFY; If NO then

Step F: Identify Payment Type

Step G: Assess whether Payment Type is selected for GPM Filter Process

    If NO then PASS payment instruction; If YES then

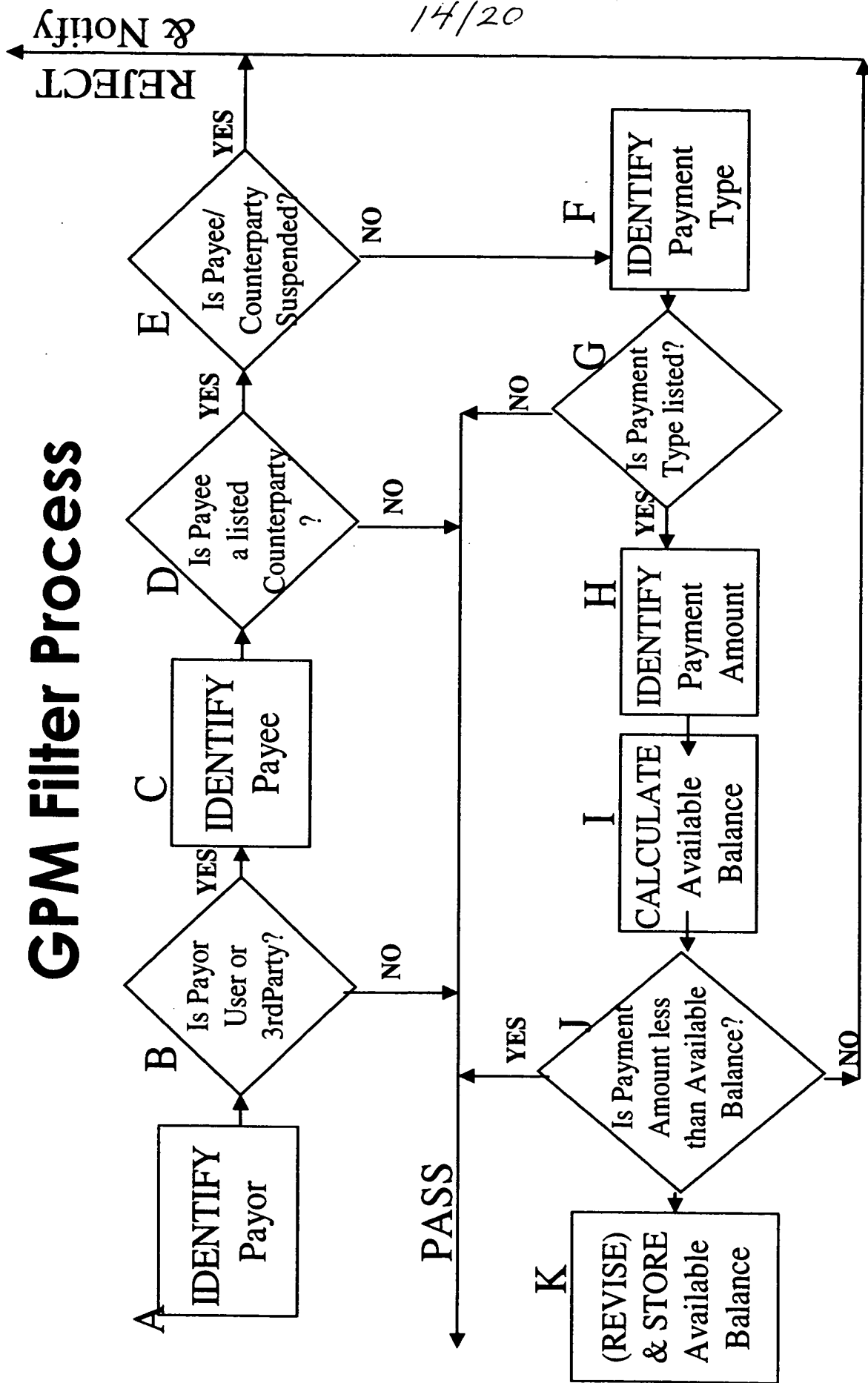Step H: Identify Payment Amount

Step I: Calculate Available Balance

Step J: Assess payment amount against Available Balance

If payment amount is less than Available Balance then PASS payment instruction; If payment amount is more than Available Balance then FAIL payment instruction + NOTIFY

Step K: Reduce Available Balance by Payment Amount

Fig. 9D2

GPM Filter Process

Fig. 9E1

Step I: Calculating Available Balance

Step I.1: Identify User/3rd Party

Step I.2: Identify Counterparty

Step I.3: Identify last stored Available Balance

3a: Available Balance will be Clean Payment Limit for initial processing

3b: Available Balance last stored by Process Filter

3c: Where Clean Payment Limit is amended intraday, the difference between the new CPL and the old CPL will be added to the stored Available Balance to either increase or decrease the Available Balance accordingly

Step I.4: Generate Inquiry to bank payment/account systems for incoming payments messages specifying Counterparty/Payee as a "Payor" and specifying User/3rd Party as "Payee" since last timestamp

Step I.5: IF payments received, THEN total all payment amounts specified in all received payments

Step I.6: Add all received amounts to the last calculated Available Balance

Step I.7: Store & Forward (revised) Available Balance to Filter Process
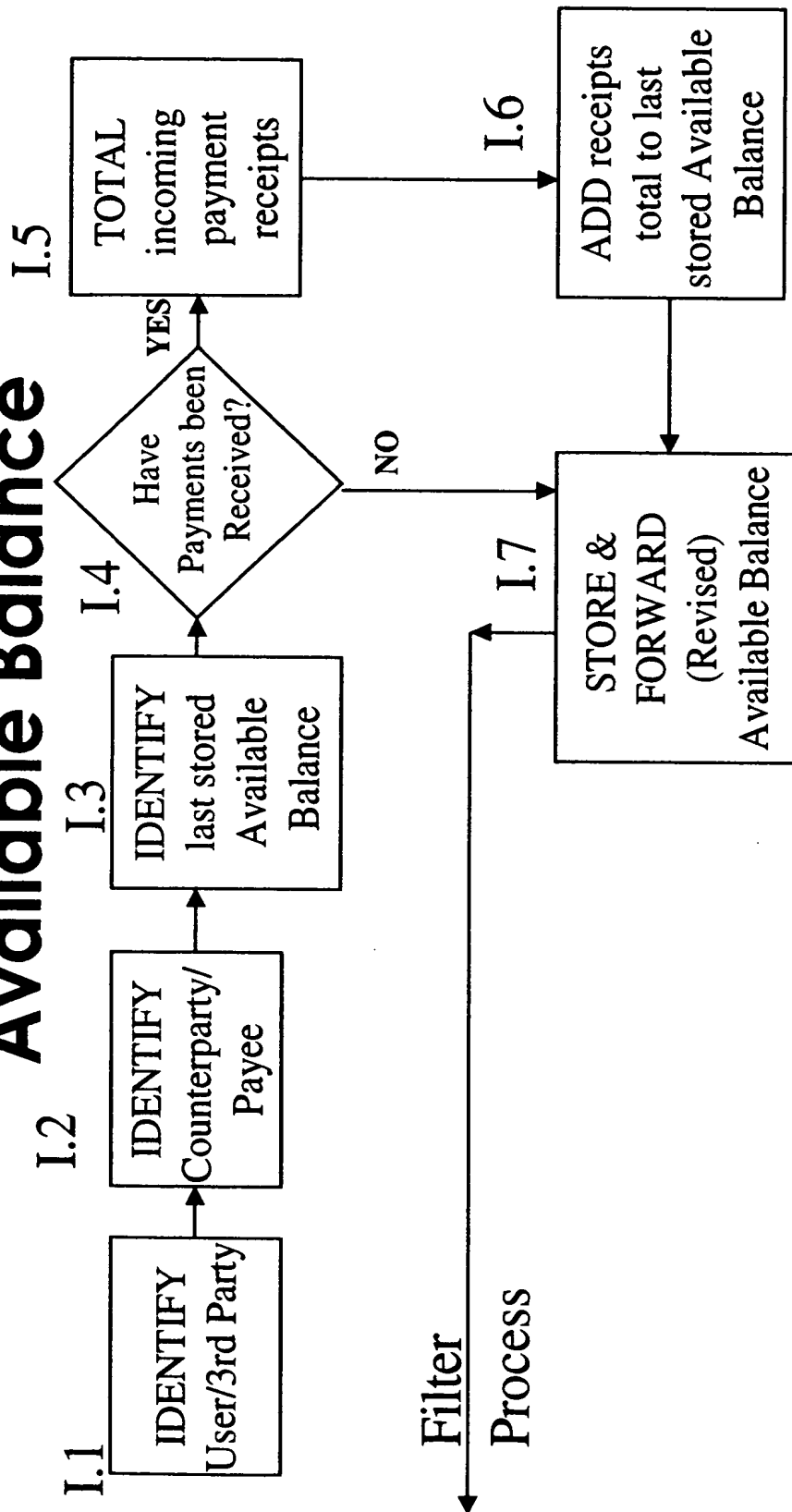
Fig. 9E2

Step I: Calculating Available Balance

I.1
IDENTIFY User/3rd Party

I.2
IDENTIFY Counterparty/ Payee

I.3
IDENTIFY last stored Available Balance

I.4
Have Payments been Received?

YES

I.5
TOTAL incoming payment receipts

I.6
ADD receipts total to last stored Available Balance

NO

I.7
STORE & FORWARD (Revised) Available Balance

Filter Process

Fig. 9F1

GPM Suspend Process

Generate &
Send

(A)

Generate &
Send &/or Relay

3rd Party
Host
Application

Generate Suspend
Counterparty &
Currency(ies)

Confirm

(F)

User Host
Application

Generates/Relays
Suspend
Counterparty &
Currency(ies)

Sort & Store
& Relay

(B)

GPM
Core
System

Sorts/Stores/Relays
Suspend

Confirm

(E)

(C) Store &
Apply

Payment
Bank Host
Application

Applies Suspend
in Filter Process

Confirm

(D)

Domestic
Payment
System

Suspend Instruction Fields

Status	Tag	Field Name	Content/Options	No
M	52a	USER	4a2a2b[3b]	1
O	50	THIRD PARTY (Ordering Customer)	4a2a2b[3b]	2
M	53a	PAYMENT BANK (Sender's Correspondent)	4a2a2b[3b]	3
---->				
M	59	COUNTERPARTY (Beneficiary Customer)	4a2a2b[3b]	4
-----|				
M	<XX>	SUSPEND INSTRUCTION	7a	5

FIELD 52A - USER
Definition: The Unique Identifier (UID) of the User institution initiating the instruction on behalf of itself or a Third Party.
Format: 4a2a2b[3b]

FIELD 50 - THIRD PARTY
Definition: The UID of the Third Party initiating the instruction to the User.
Format: 4a2a2b[3b]

FIELD 53a - PAYMENT BANK
Definition: The BIC code of the Payment Bank
Format: 4a2a2b[3b]

FIELD 59 - COUNTERPARTY
Definition: The UID of the Counterparty/Payee on outgoing payments instructions.
Format: 4a2a2b[3b]
The message structure allows for multiple Counterparties to be listed, as many Users and Third Parties will want to aggregate affiliated market trading entities as a single, "synthetic counterparty" for payments risk management purposes.

FIELD XX - SUSPEND INSTRUCTION
Definition: Suspends payments in Filter Process
Format: 7a (e.g., "suspend")

Fig. 9F3

GPM Suspend Process

3rd PARTY/USER HOST APPLICATION

Step A.1: Select Counterparty

Step A.2: Select Currency(ies)

Step A.3: Select Suspend Instruction

Step A.4: Generate Suspend Instruction

Step A.5: Confirm Suspend Instruction ──────→

GPM CORE SYSTEM APPLICATION

Step B.1: Receive Suspend Instruction

Step B.2: Identify Payment Bank(s) for selected Currency(ies)

Step B.3: Send Suspend Instruction to Payment Bank Host Applications ──────→

PAYMENT BANK HOST APPLICATION

Step C.1: Receive Suspend Instruction

Step C.2: Apply SUSPEND in Step 5 of Filter Process

Step D: Confirm Suspend Instruction Implemented

Step E: Confirm Suspend Instruction Implemented ←──────

Step F: Receive Confirmation Suspend Instruction Implemented ←──────

Fig. 10

GPM Risk Reduction

- Clear limits on Payment Risk and Liquidity Risk

- Effective elimination of Systemic Risk

- No disruption to existing payment mechanisms

- Unilateral choice of Risk Parameters and GPM implementation with counterparty